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(12) **United States Patent**
Hopkins

(10) **Patent No.:** **US 9,171,049 B2**
(45) **Date of Patent:** **Oct. 27, 2015**

(54) **OFFLINE SIMULATION OF ONLINE
SESSION BETWEEN CLIENT AND SERVER**

USPC 715/513, 501.1, 201–203, 736, 740,
715/745; 709/203, 213–229; 434/118, 362
See application file for complete search history.

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(73) Assignee: **salesforce.com, Inc.**, San Francisco, CA
(US)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 2127 days.

(21) Appl. No.: **10/287,177**

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Related U.S. Application Data

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13, 2002.

(51) **Int. Cl.**
G06F 17/00 (2006.01)
G06F 17/30 (2006.01)
G06F 3/0484 (2013.01)

(Continued)

(52) **U.S. Cl.**
CPC **G06F 17/30575** (2013.01); **G06F 3/0484**
(2013.01); **G06F 17/303** (2013.01); **G06F**
17/30861 (2013.01); **H04L 41/145** (2013.01);
H04L 67/14 (2013.01); **H04L 67/2804**
(2013.01); **H04L 67/42** (2013.01); **H04L**
12/2602 (2013.01); **H04L 29/06** (2013.01);
H04L 29/0809 (2013.01); **H04L 29/08072**
(2013.01); **H04L 41/22** (2013.01); **H04L 63/08**
(2013.01); **H04L 63/102** (2013.01)

(58) **Field of Classification Search**
CPC ... G06F 17/303; H04L 67/2804; H04L 67/14;
H04L 29/08072; H04L 29/06; H04L 29/0809;
H04L 63/08; H04L 63/102; H04L 41/22;
H04L 12/2602

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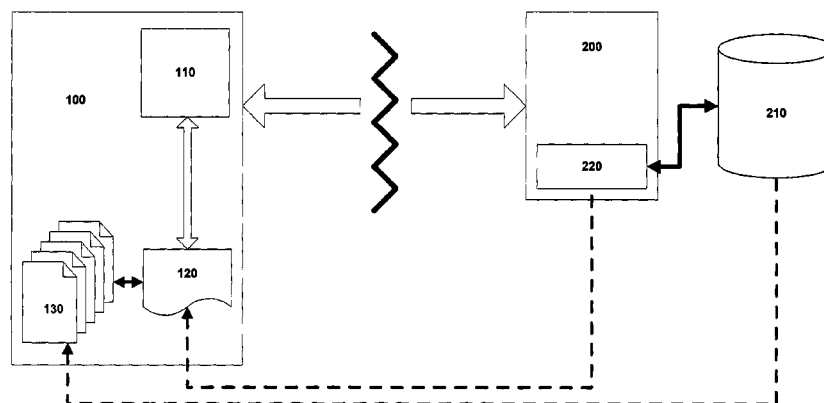
Primary Examiner — Quoc A Tran

(74) *Attorney, Agent, or Firm* — Haynes Beffel & Wolfeld
LLP

(57) **ABSTRACT**

Systems and Methods for conducting an offline session simulating an online session between a client and server in a network environment. The client imports data and functional logic from the server prior to going offline. The imported functional logic is embedded into a format or document that is capable of being interpreted and performed by the local interface at the client that is used to interact with server when online. Whether offline or online, the user utilizes the same local interface at the client to transmit instructions to the functional logic to manipulate the data. In an offline session, such instructions cause the imported and embedded functional logic to execute, thereby manipulating the data imported at the client. Known synchronization methods may also be used to maintain consistency and coherency between the imported data at the client and the database at the server.

28 Claims, 25 Drawing Sheets



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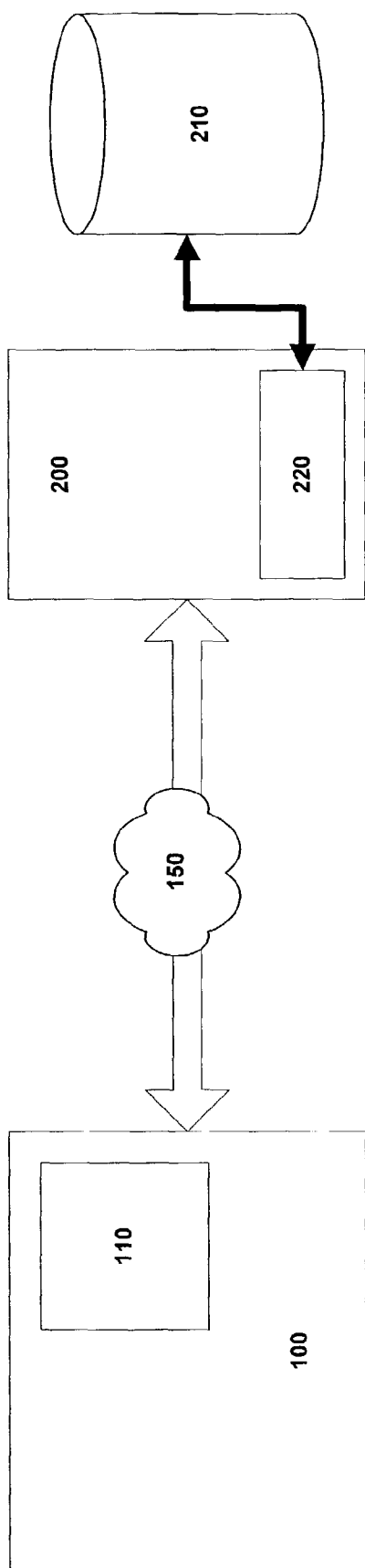


FIGURE 1

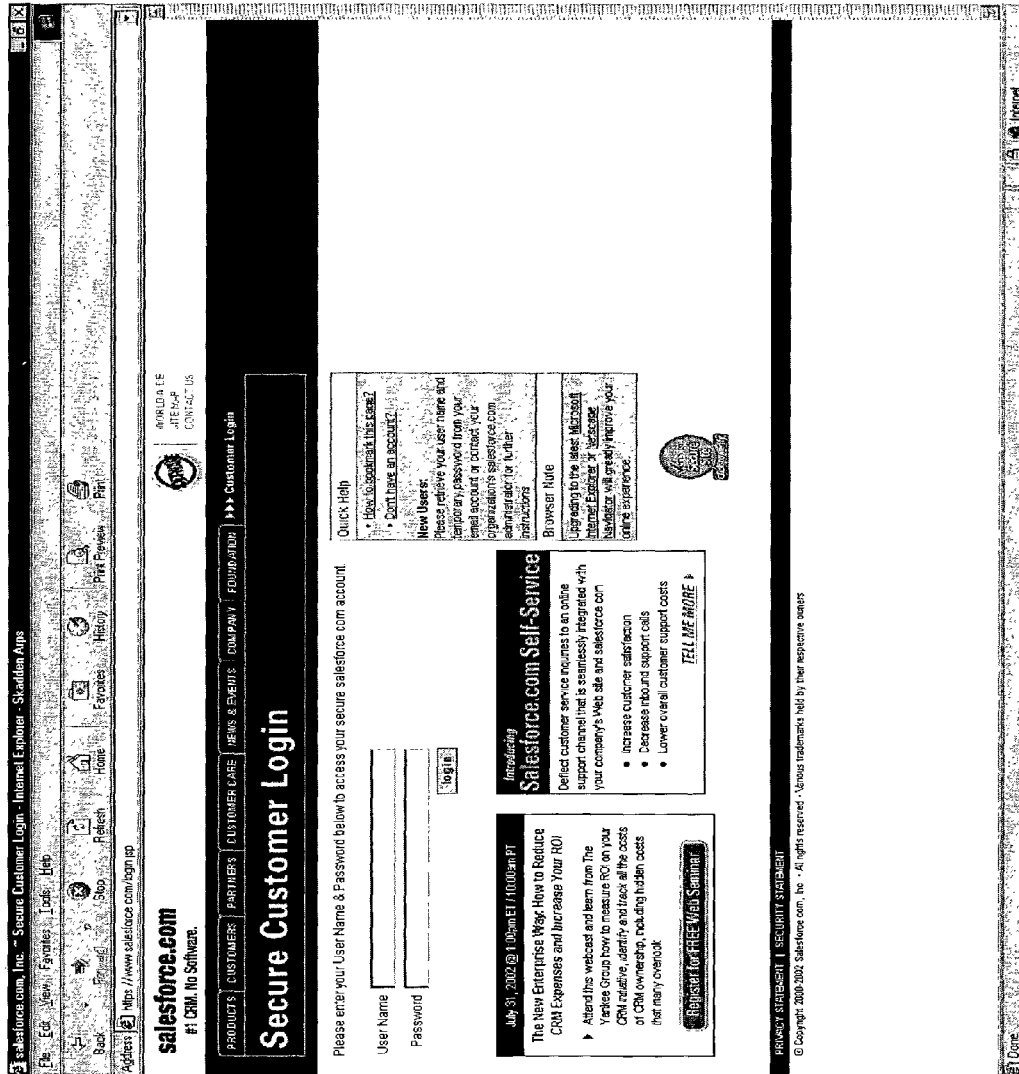


FIGURE 2

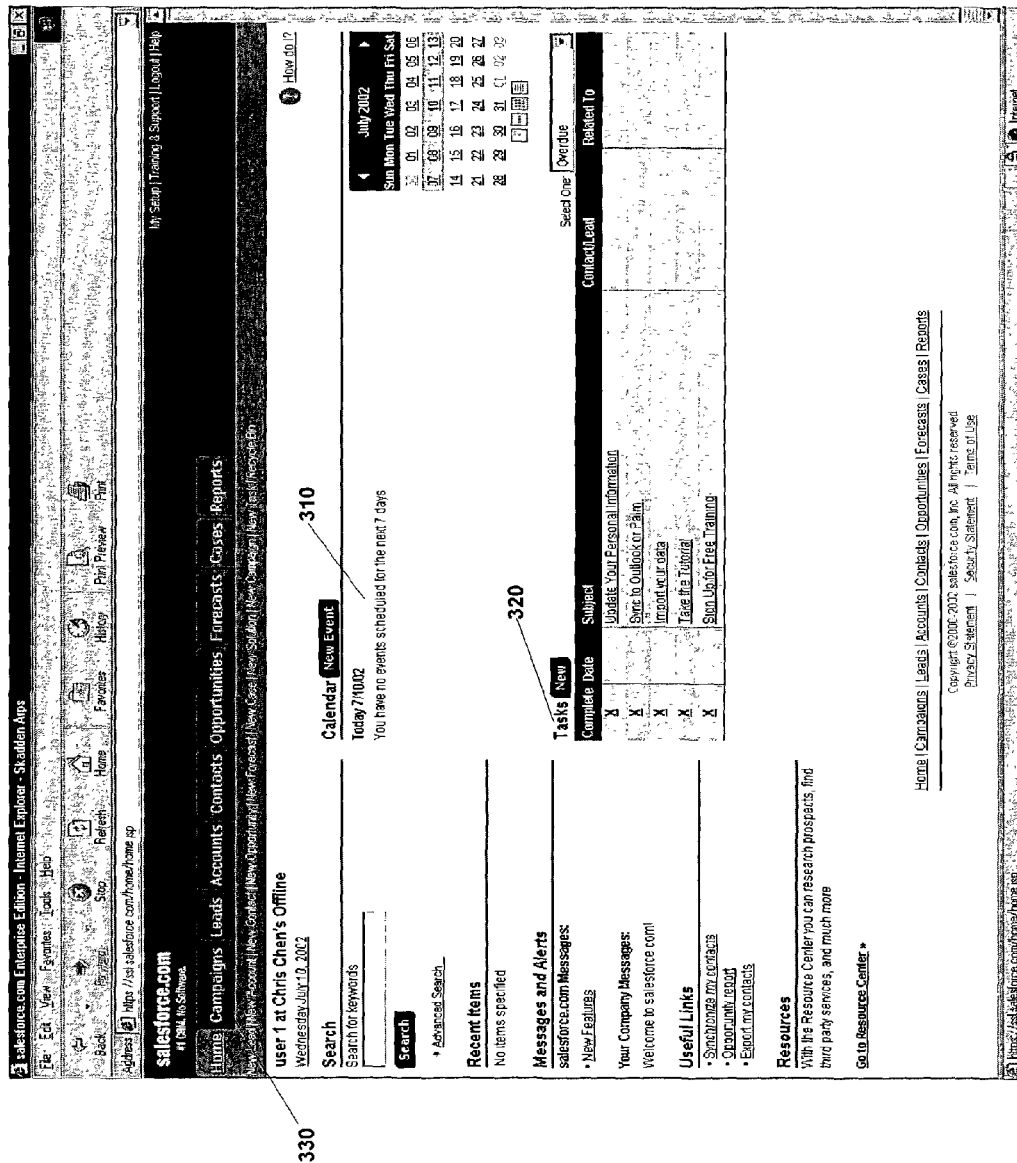


FIGURE 3

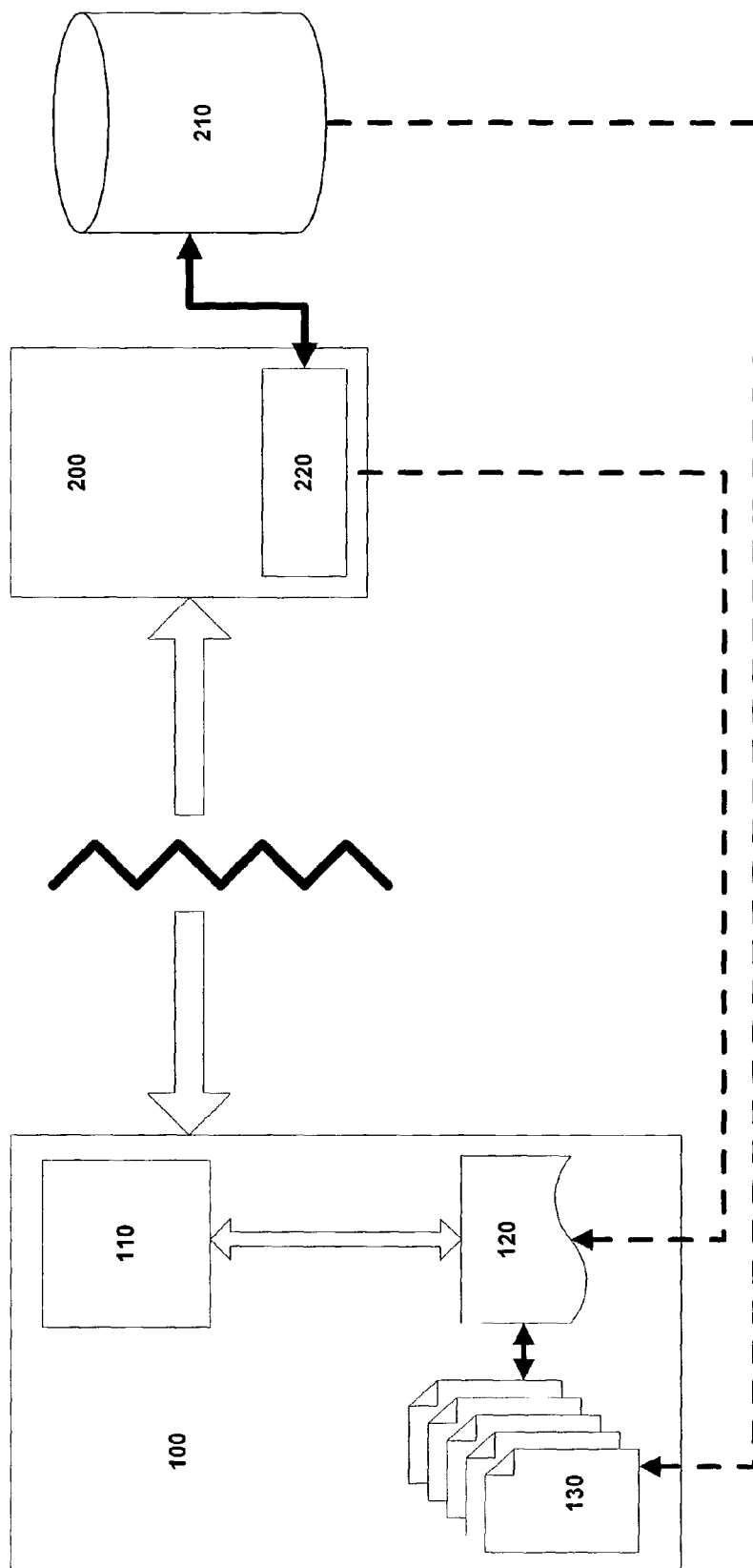


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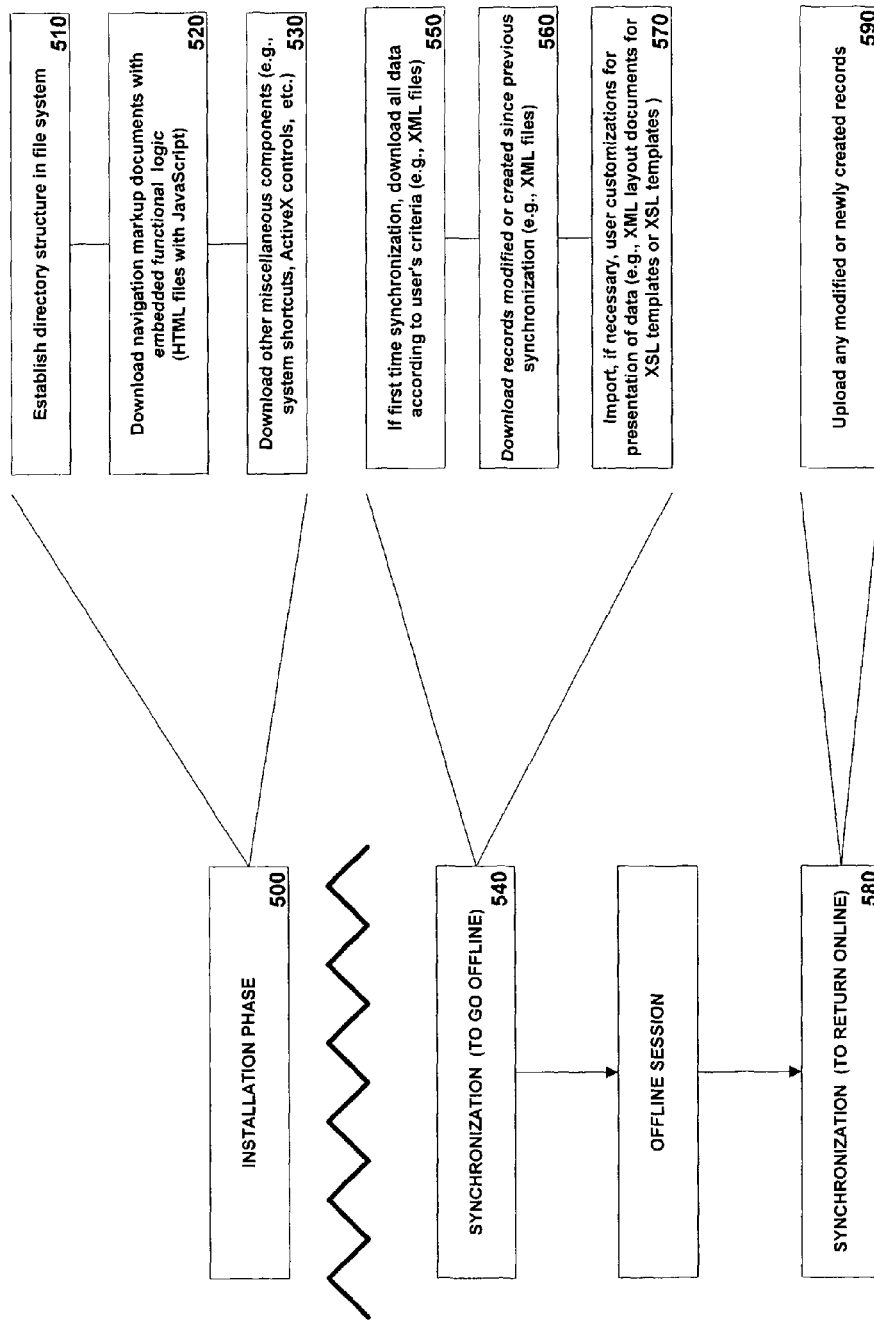


FIGURE 5

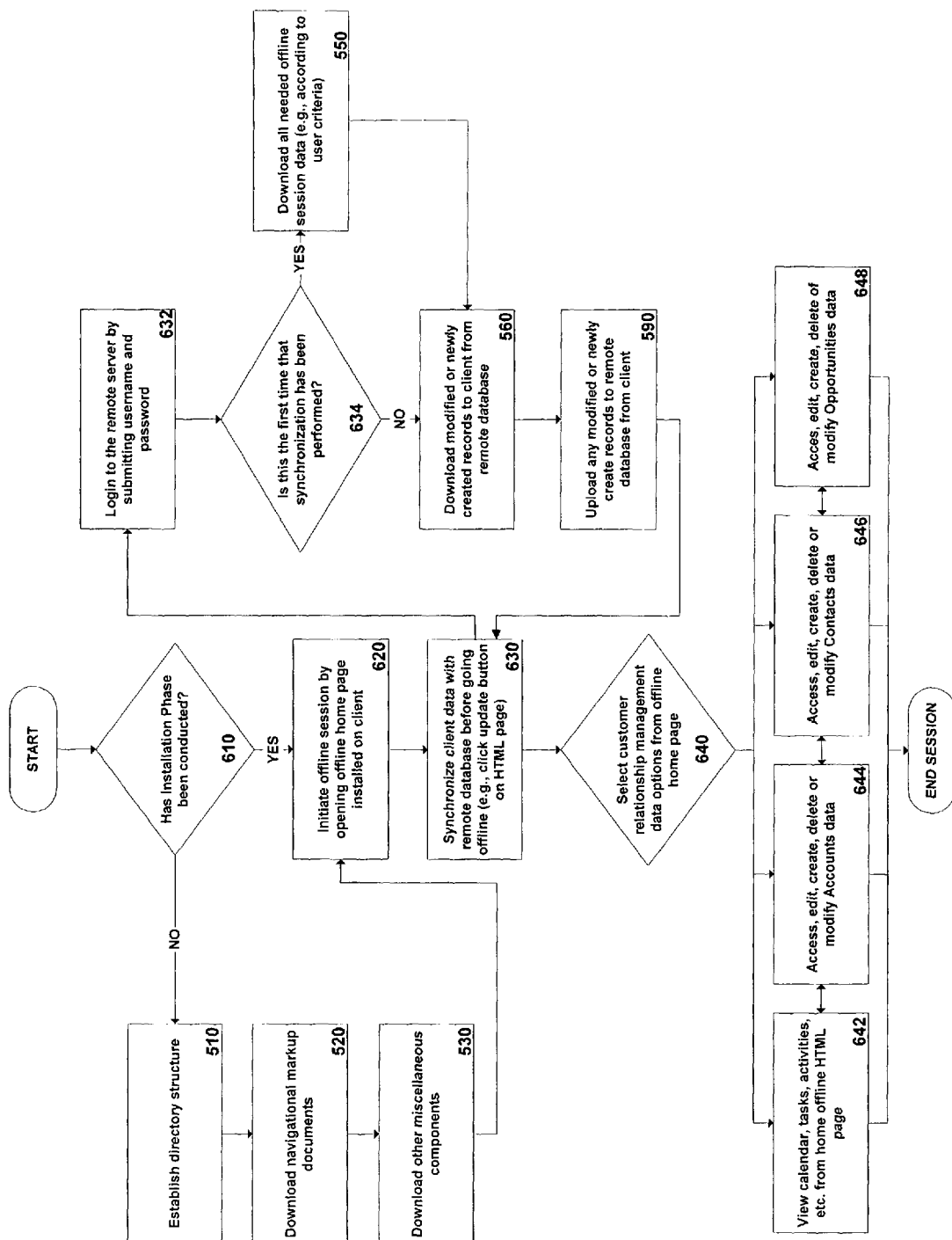


FIGURE 6

Login to salesforce.com -- Web Page Dialog

salesforce.com
#1 CRM Online. Offline.

Secure Offline Login

User name:

Password:

☐ Refresh all my data

Login Cancel

FIGURE 7

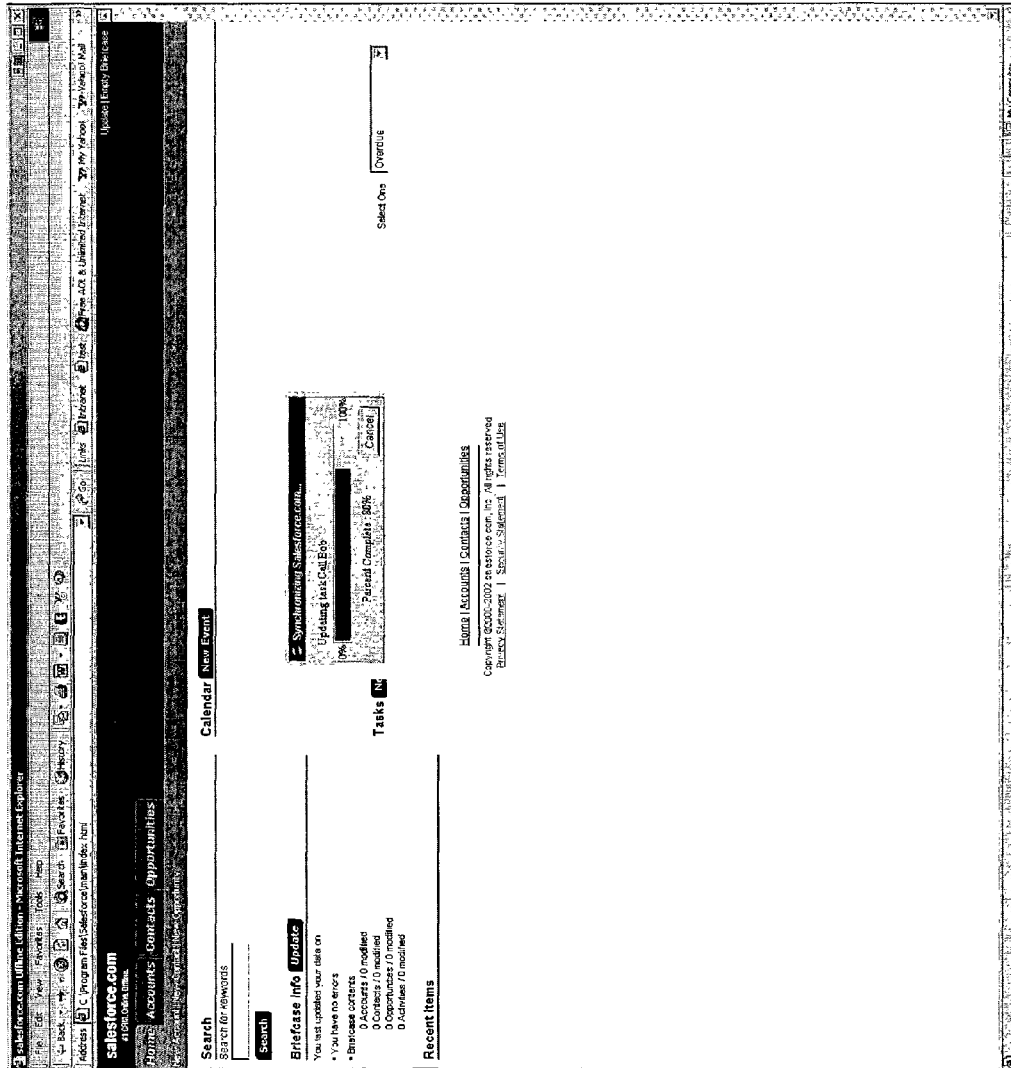


FIGURE 8

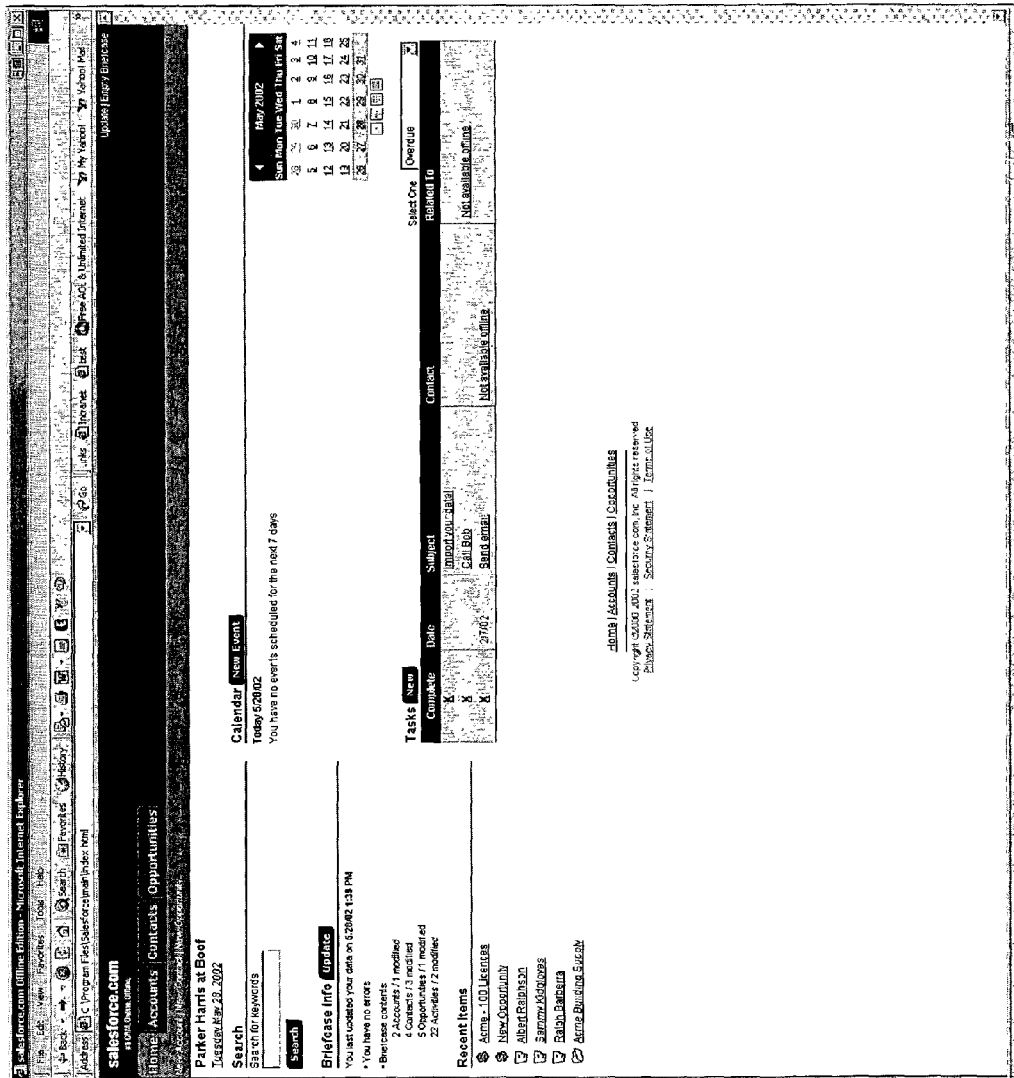


FIGURE 9A

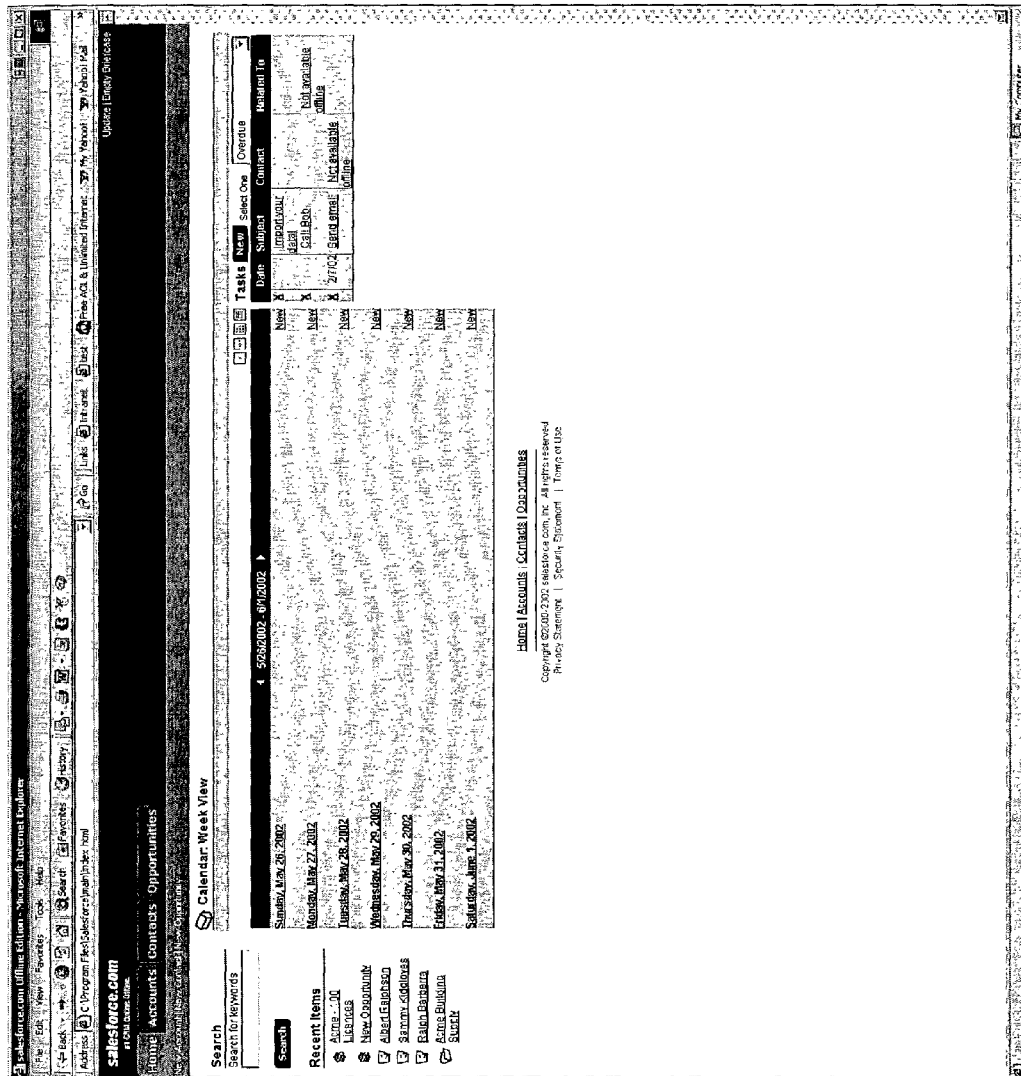


FIGURE 9B

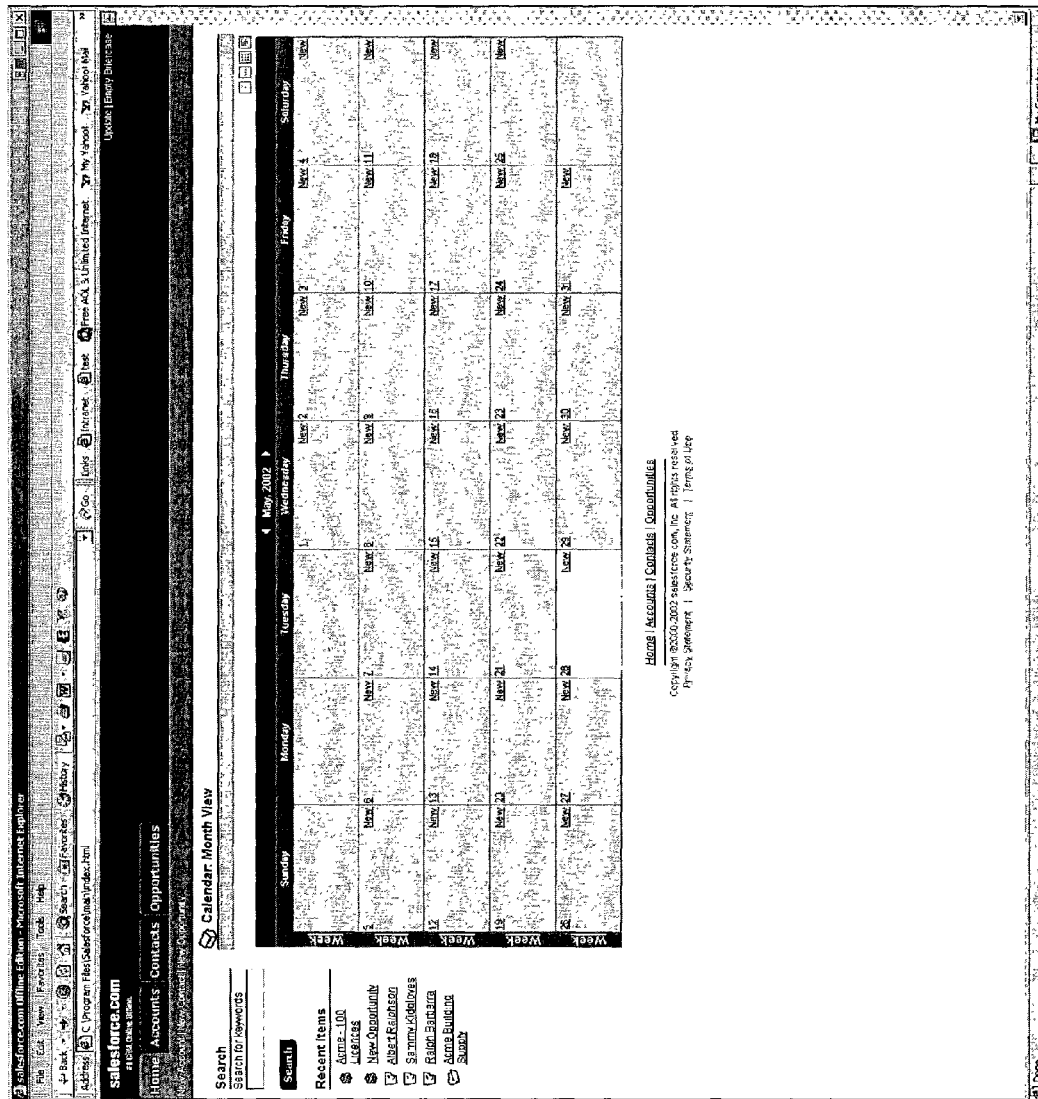
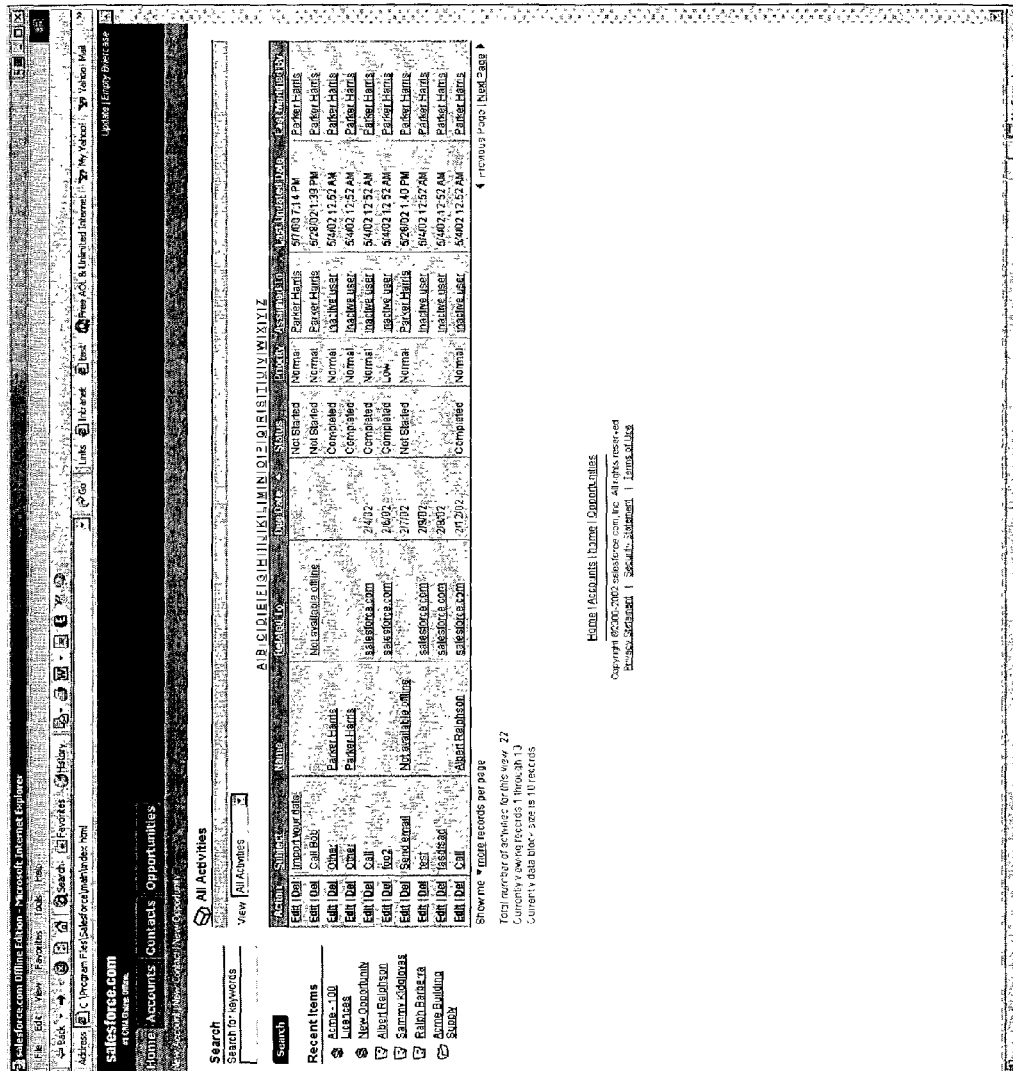


FIGURE 9C



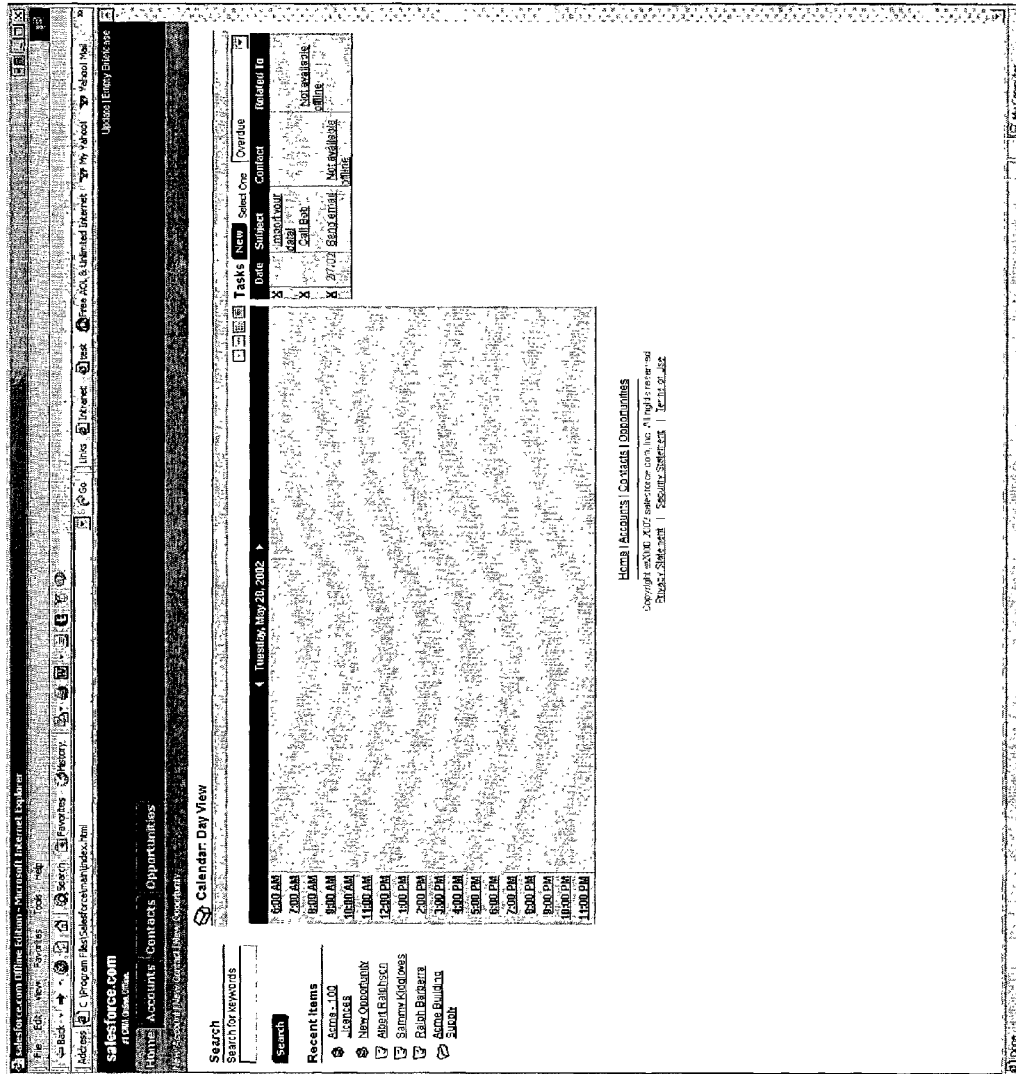


FIGURE 9E

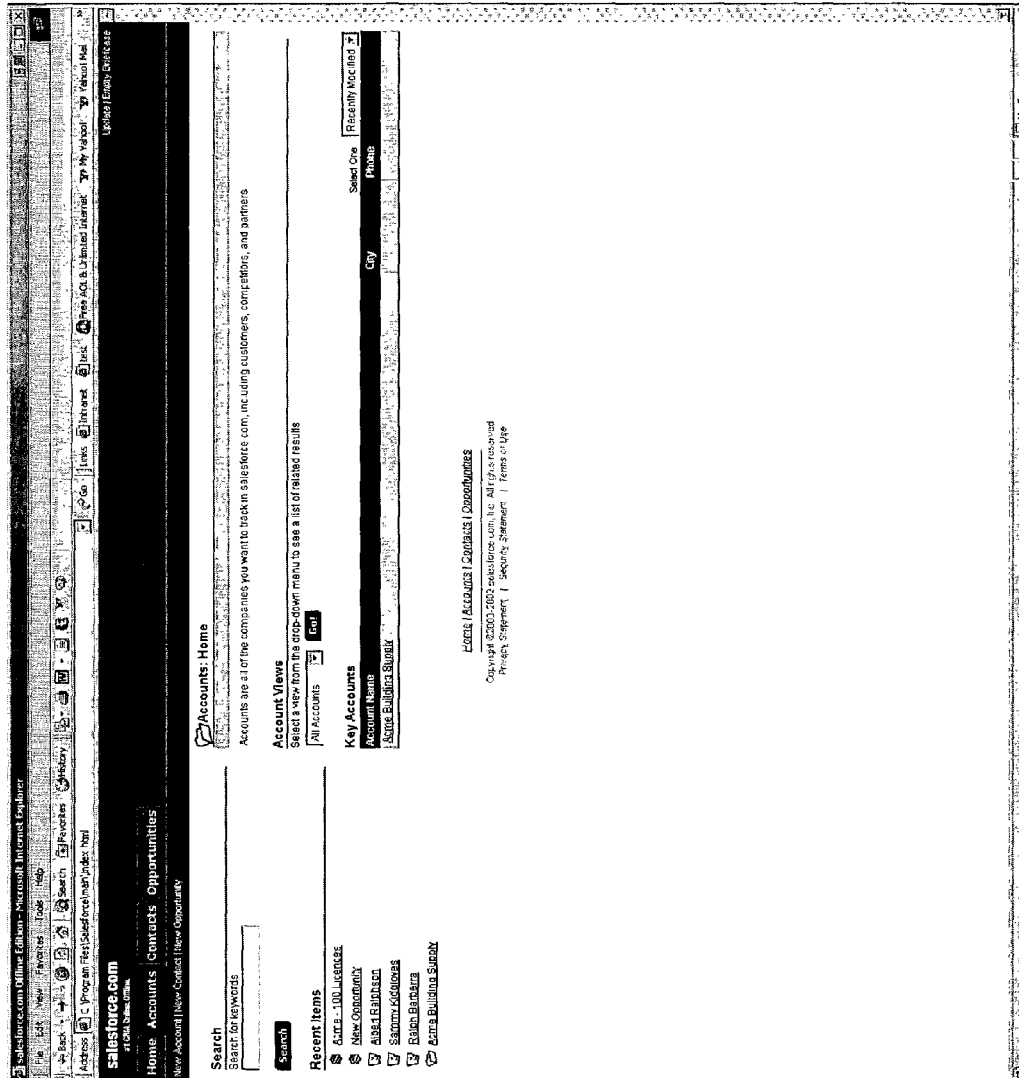


FIGURE 10A

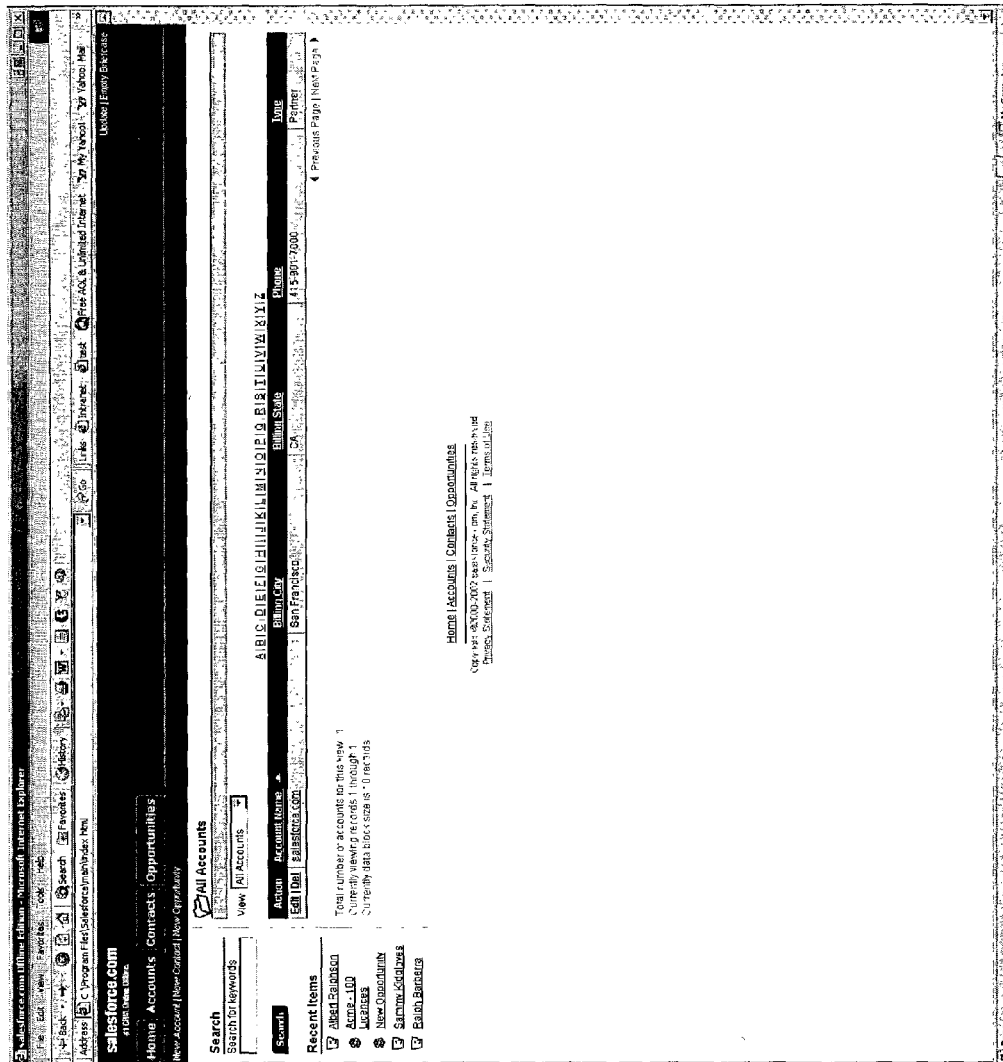


FIGURE 10B

Internet Explorer - salesforce.com

File Edit View Favorites Tools Help

Address Bar: http://salesforce.com/

Update Every 5 Seconds

salesforce.com

Home Accounts Contacts Opportunities

New Account New Contact New Opportunity

Search

Search for keywords

Recent Items

- salesforce.com
- Alerts/Emails
- Alerts-100
- Leads
- New Opportunity
- Saving Accounts
- Rollback

Account: salesforce.com

Account Name: salesforce.com

Account Site: salesforce.com

Parent Account: salesforce.com

Website: http://www.salesforce.com

Account Owner: Partner Harris

Account Number: 101 Spear Street, Ste. 203, San Francisco, CA 94105, USA

Annual Revenue: \$100,000.00

Type: Partner

Phone: 415.901.7000

Fax: 415.901.7000

Created By: Partner Harris, 5/7/00 7:14 PM

Modified By: Partner Harris, 5/4/02 12:52 AM

Designation: 2277

Account Details:

Telem System: Overlaid Private

Employees: 1

SIC Code: 101 Spear Street, Ste. 203, San Francisco, CA 94105, USA

Billing Address: 101 Spear Street, Ste. 203, San Francisco, CA 94105, USA

Shipping Address: 101 Spear Street, Ste. 203, San Francisco, CA 94105, USA

Industry: Internet business applications

Phone: 415.901.7000

Fax: 415.901.7000

Modified By: Partner Harris, 5/4/02 12:52 AM

Designation: 2277

Contacts **New**

| Action | Contact Name | Title | Email | Phone |
|----------|-----------------|-------|-------|-------|
| Edit Del | Samuel Harrison | | | |
| Edit Del | Samuel Harrison | | | |
| Edit Del | Samuel Harrison | | | |
| Edit Del | Samuel Harrison | | | |

Opportunities **New**

| Action | Opportunity Name | Stage | Amount | Close Date |
|----------|----------------------|-------------------|--------------|------------|
| Edit Del | New Opportunity | Needs Analysis | \$500.00 | 2/18/02 |
| Edit Del | New Opportunity | Needs Analysis | \$100.00 | 2/18/02 |
| Edit Del | Sample Opportunity 1 | Proposal Analysis | \$100,000.00 | 5/30/00 |
| Edit Del | Sample Opportunity 1 | Proposal Analysis | \$100,000.00 | 5/30/00 |
| Edit Del | Sample Opportunity 2 | Proposal Analysis | \$50,000.00 | 8/30/00 |

Open Activities **New Event**

| Action | Subject | Related To | Type | Date | Status | Priority | Assigned To |
|----------|----------------------|----------------------|------|---------|-------------------------|----------|---------------|
| Edit Del | Not available online | Sample Opportunity 1 | Task | 2/27/02 | Waiting on someone else | High | Inactive user |

Activity History **Log A Call** **View All**

| Action | Subject | Related To | Type | Date | Status | Priority | Assigned To | Last Updated |
|----------|----------------------|----------------------|-------|---------|-------------------------|----------|---------------|-----------------|
| Edit Del | Not available online | Sample Opportunity 1 | Event | 2/27/02 | Waiting on someone else | High | Inactive user | 5/7/02 10:39 AM |
| Edit Del | Not available online | Sample Opportunity 1 | Event | 2/27/02 | Waiting on someone else | High | Inactive user | 5/7/02 10:39 AM |

FIGURE 10C

salesforce.com | Office Edition - Microsoft Internet Explorer

Address: C:\Program Files\Internet Explorer\... | My Yahoo! Mail | Update Yahoo! Toolbar

salesforce.com
Home | Accounts | Contacts | Opportunities

Account Edit: New Account

Search: Search for keywords

Recent Items: Add-Ins, Accounts, New Opportunity, All Lead Relationships, Summary Knowledge, Sales Dashboard, Account Building, Submit

Account Information: Save Save & New Cancel

| | |
|----------------|-----------------|
| Account Name | Under Study |
| Account Site | Ownership: None |
| Parent Account | Employees |
| Website | SIC Code |

Address Information: Save Save & New Cancel

| | | |
|------------------------------|------------------|-----------------|
| Billing Address | State/Province | City |
| Account Owner: Parker Harris | Zip/Postal Code | Country |
| Account Number | Shipping Address | City |
| | State/Province | Zip/Postal Code |
| | Country | |

Additional Information: Save Save & New Cancel

| | |
|----------------|----------------|
| Type: None | Industry: None |
| Annual Revenue | Rating: None |
| Phone | Fax |
| Percent | |

Description Information: Save Save & New Cancel

| |
|-------------|
| Description |
|-------------|

Home | Accounts | Contacts | Opportunities
Copyright © 2000-2002 salesforce.com, Inc. All rights reserved.
Privacy | Terms of Use | Sales Dashboard | Terms of Use

FIGURE 10D

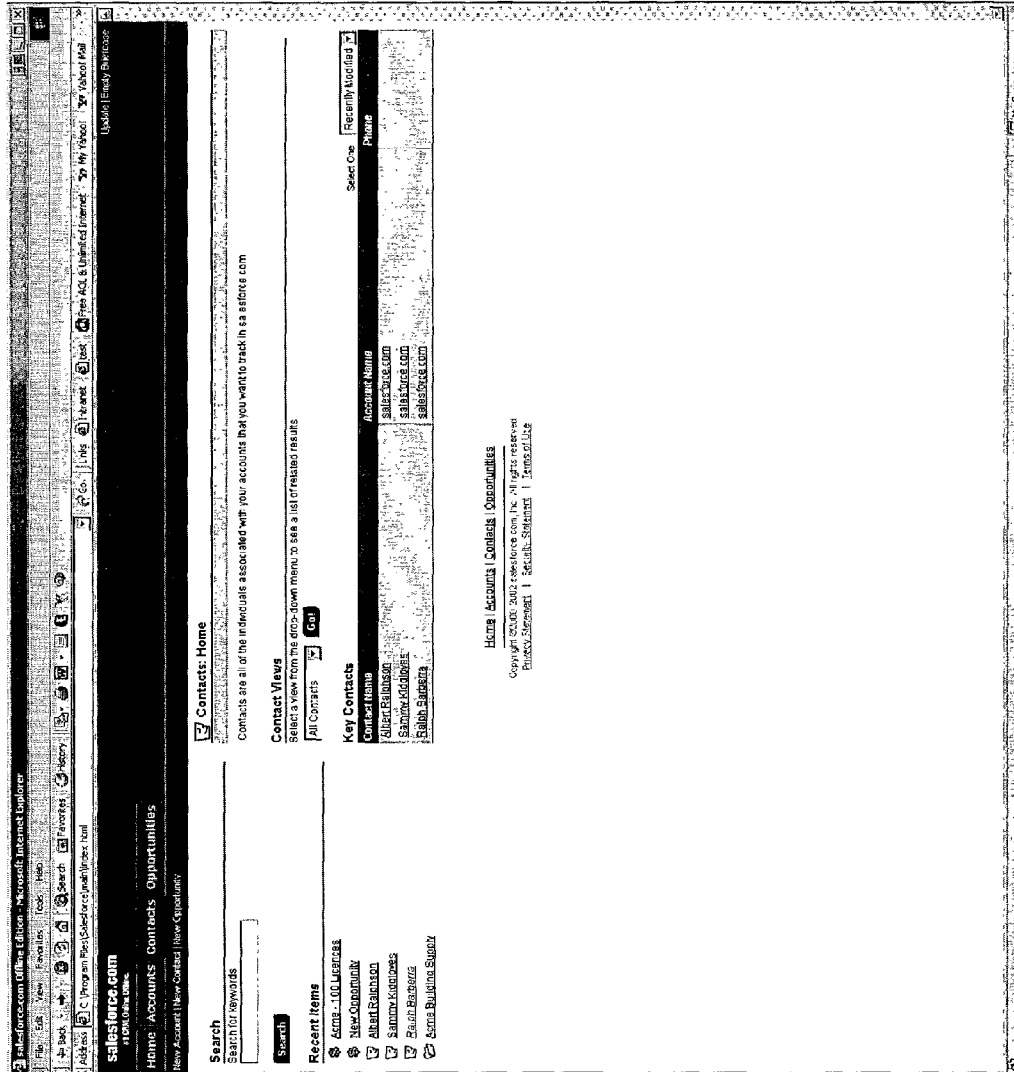


FIGURE 11A

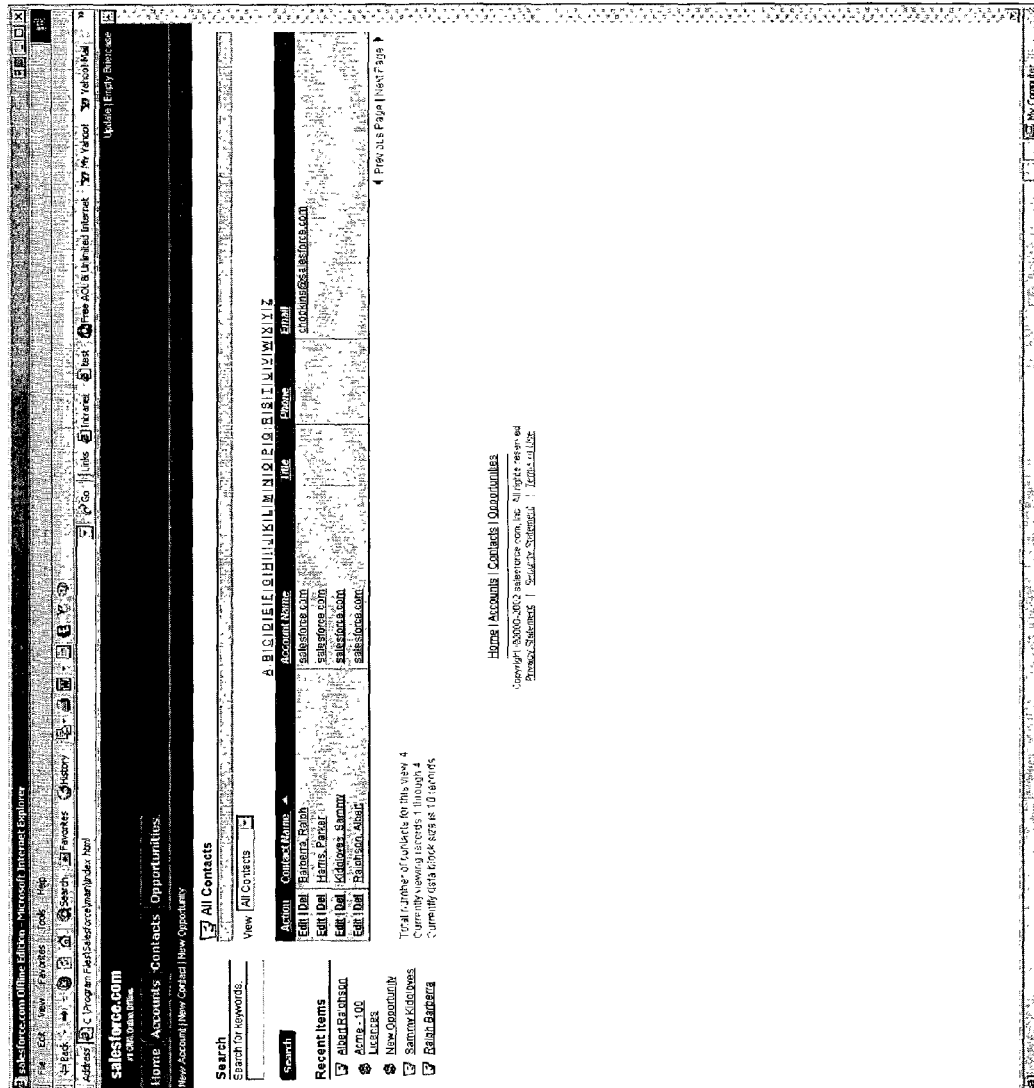


FIGURE 11B

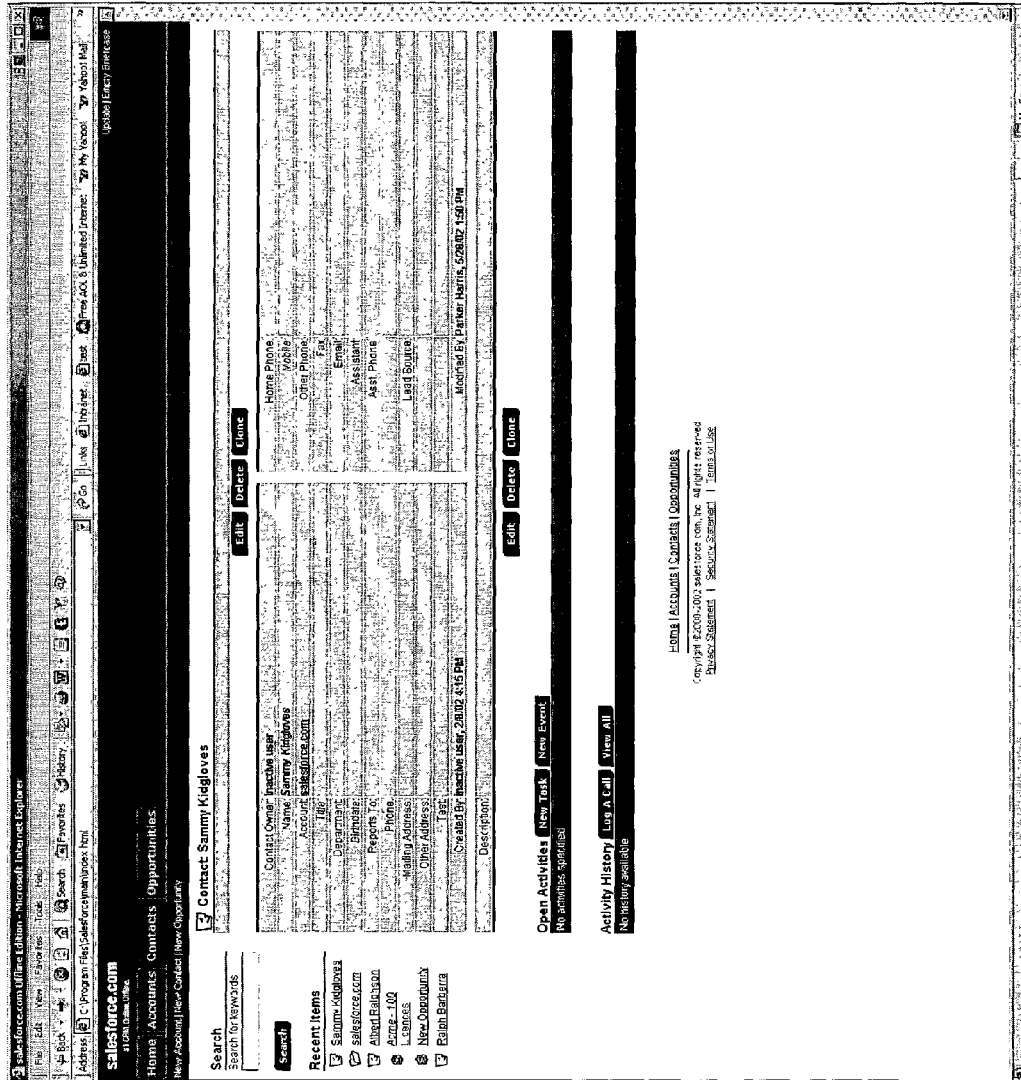


FIGURE 11C

Internet Explorer - salesforce.com

Address: C:\Program Files\Internet Explorer\iexplore.exe

salesforce.com
1000 15th Street, San Francisco, CA 94103

Home Accounts Contacts Opportunities

Search
SEARCH BY KEYWORDS
[Search]
Recent Items
Alfred Balch320
Astra-100 Licenses
New Consignment
Simon LeBlanc
Rachin Bhandari

Contact Edit New Contact

Save Save & New Cancel

Contact Information

Contact: Overton Harris
Salutation: [None]
First Name: [Last Name]
Last Name: [Account]
Title: [Department]
Department: [Single]
Business Title: [Phone]
Home Phone: [Mobile]
Office Phone: [Fax]
Email: [Leads]
Lead Source: [Note]

Address Information

Mailing Address: [City]
City: [State/Province]
State/Province: [Zip/Postal Code]
Zip/Postal Code: [Country]
Country: [City]
City: [State/Province]
State/Province: [Zip/Postal Code]
Zip/Postal Code: [Country]
Country:

Additional Information

Description Information

Save Save & New Cancel

FIGURE 11D

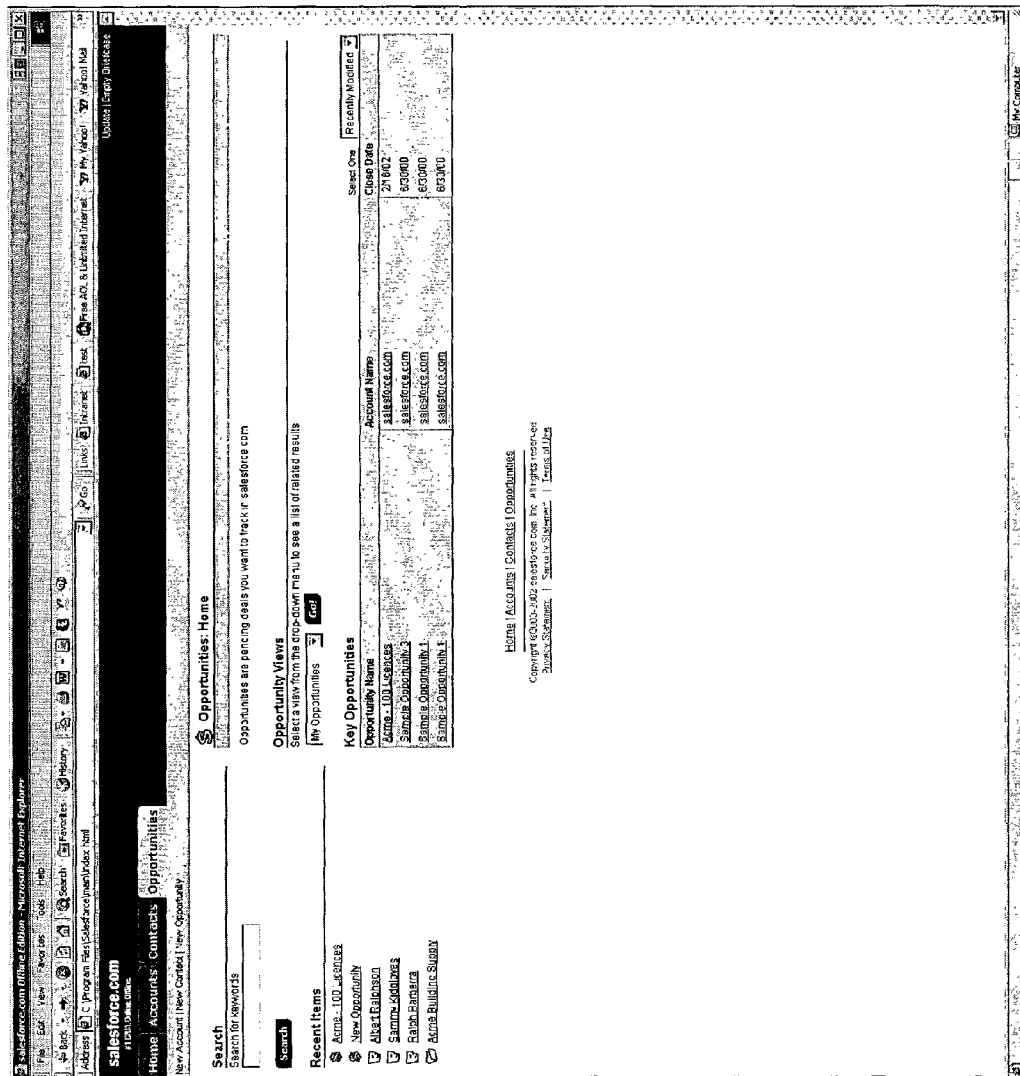


FIGURE 12A

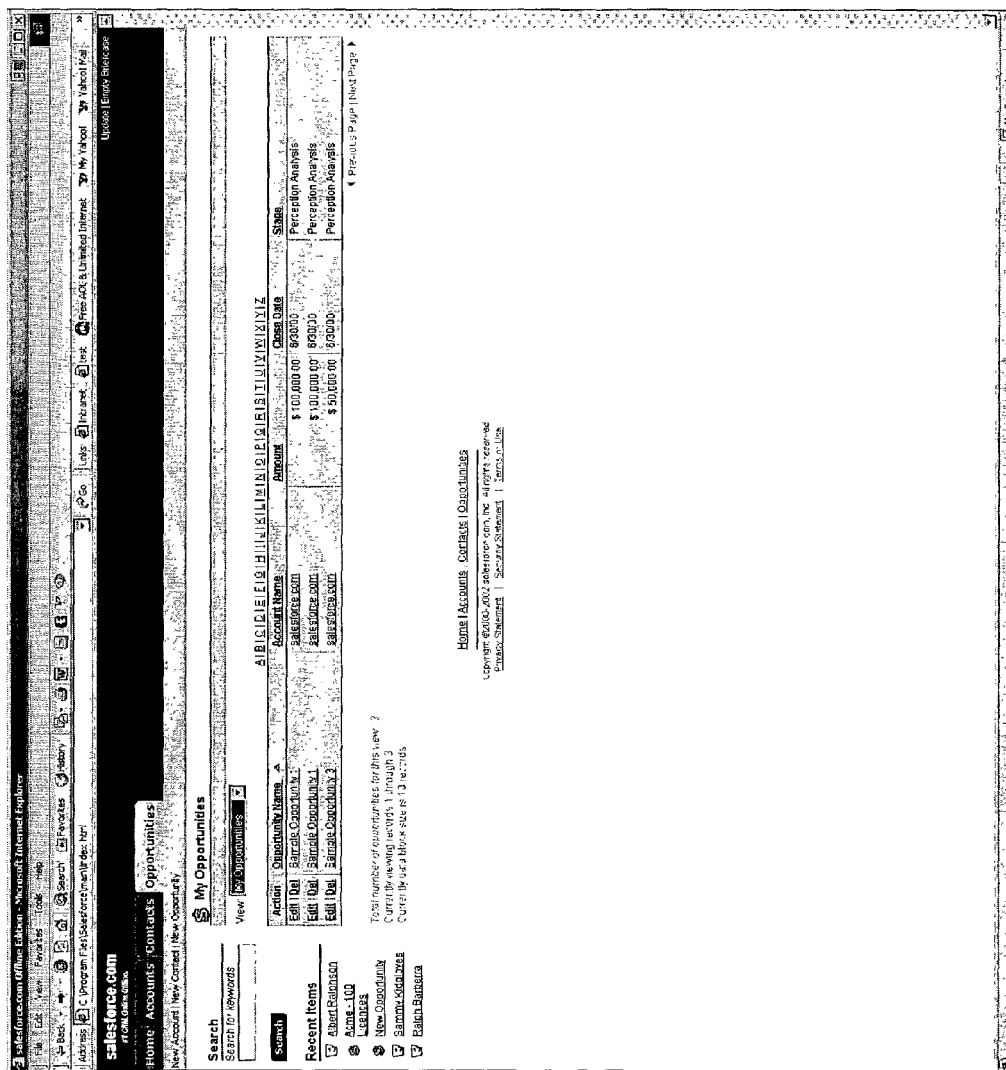


FIGURE 12B

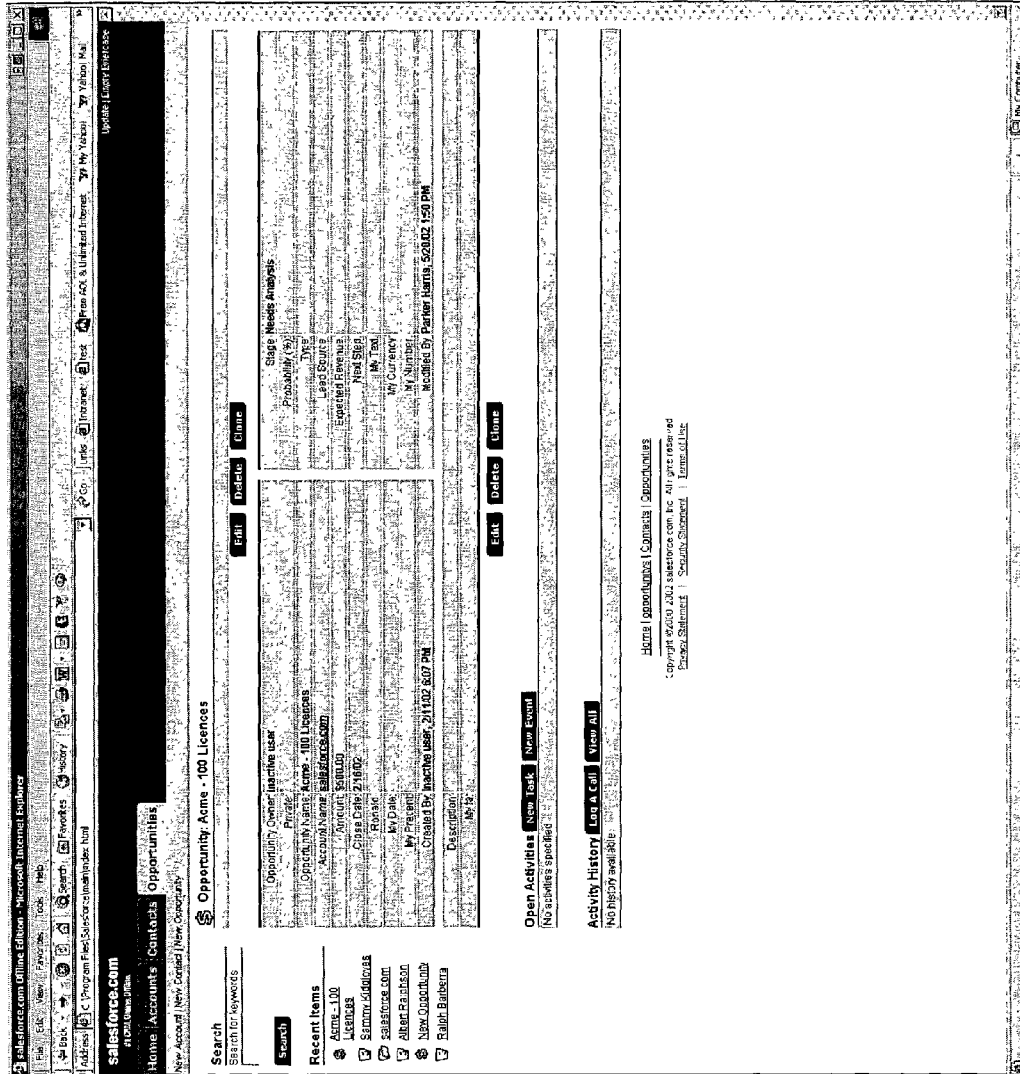


FIGURE 12C

[illegible]

FIGURE 12D

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OFFLINE SIMULATION OF ONLINE SESSION BETWEEN CLIENT AND SERVER

RELATED APPLICATIONS

This application claims the benefit of U.S. provisional patent application No. 60/388,832 filed on Jun. 13, 2002.

FIELD OF INVENTION

The present invention relates to a computer method and system for simulating an online session while offline, and more particularly, to such a method and system in the field of customer relationship management.

BACKGROUND OF THE INVENTION

The Internet provides the capability to provide services to customers without requiring them to install additional software on their local computers. Specifically, by exploiting the customer's web browser, all functional logic and all data can reside at a remote server rather than at the customer's local computer (i.e., the client). As such, the customer, via instructions submitted through web pages that are displayed in the web browser, can remotely invoke the functional logic to view, create, update, delete or otherwise modify the data residing on the remote server.

In the field of customer relationship management ("CRM"), the foregoing use of the Internet is ideal for enabling sales, customer support, and marketing teams and individuals to organize and manage their customer information. For example, all leads, opportunities, contacts, accounts, forecasts, cases, and solutions can be stored at a secure data center but may be easily viewed by any authorized salesperson (e.g., with a proper username and password) through a web browser and Internet connection. One key benefit of such an online CRM solution is the ability to share data real-time and enable all team members to leverage a common set of information from one accessible location. For example, sales managers can track forecast rollups without requiring each sales representative to submit individual reports, as well as instantly access aggregated sales data without requiring each sales representative to manually submit such data. Similarly, reseller sales representatives and other external partners can be granted secure access to a company's sales data by providing them a username and password for the web site.

Nevertheless, such an online CRM solution suffers from the requirement that a user must have access to an Internet connection in order to access and manipulate the data residing on the remote server. For example, when a sales representative or manager is working in the field, such an Internet connection may not be readily available. As such, what is needed is a method for simulating an online session while the user is offline (e.g., without a network connection). Furthermore, it would be advantageous if such a method minimized the amount of user training and client-side installation and customization by taking advantage of pre-existing interfaces and technologies on the client computer.

SUMMARY OF THE INVENTION

The present invention provides a method and system for simulating an online session between the client and a remote server when the client is offline. The client includes a local interface that can communicate with the remote server. During an online session, the data and the functional logic that is invoked to manipulate the data reside on the remote server. As

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such, the user transmits instructions to view, create, update, delete, or otherwise modify portions of data through the local interface and subsequently through the underlying network. These instructions are ultimately received at the remote server, which then invokes the proper functional logic to perform the instructions in order to manipulate the data.

In preparation for simulating an online session when the client is offline, when the client is online, it imports at least a subset of the data that resides at the remote server. Furthermore, the client imports at least a subset of the functional logic used to manipulate the data as an embedded portion of a format or document that is capable of being interpreted and performed by the local interface. To initiate an offline session, the user invokes the local interface (as in the online session). However, rather than accessing the remote server, the local interface accesses local documents formatted with the embedded functional logic. As in the online session, the user transmits instructions to view, create, update, delete, or otherwise modify portions of data through the local interface. However, rather than transmitting the instructions through an underlying network, the local interface invokes the embedded functional logic in the documents to manipulate the imported data in response to the instructions. As such, the present invention provides an offline simulation of an online session between the client and a remote server. Because the same local interface that is used in the online session is also used in the offline session, user training for the offline session is minimized or even eliminated. Furthermore, since functional logic is embedded into a format capable of being interpreted and performed by the local interface, the need to install additional standalone software applications is also minimized or eliminated. Further objects and advantages of the present invention will become apparent from a consideration of the drawings and detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagram illustrating an online session between a client with a local interface and a remote server with a relational database and functional logic.

FIG. 2 is an example of a client initiation of an online CRM session with a remote server.

FIG. 3 is an example of the presentation of CRM data on a client's web browser during an online CRM session.

FIG. 4 is a diagram illustrating an offline session.

FIG. 5 is an expanded block diagram illustrating one embodiment of the various phases used to provide a client with the capabilities of engaging in an offline CRM session.

FIG. 6 is a flowchart illustrating one embodiment of a process for conducting an offline CRM session.

FIG. 7 is an example of a login session to connect to a remote server during a synchronization process.

FIG. 8 is an example of a visual representation of a synchronization process with the remote server.

FIG. 9A is a first example of the presentation of CRM data during an offline session (Home View).

FIG. 9B is a second example of the presentation of CRM data during an offline session (Home View).

FIG. 9C is a third example of the presentation of CRM data during an offline session (Home View).

FIG. 9D is a fourth example of the presentation of CRM data during an offline session (Home View).

FIG. 9E is a fifth example of the presentation of CRM data during an offline session (Home View).

FIG. 10A is an example of the presentation of "Accounts" CRM data during an offline session (Home View).

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FIG. 10B is an example of the presentation of "Accounts" CRM data during an offline session (All Accounts View).

FIG. 10C is an example of the presentation of "Accounts" CRM data during an offline session (Specific Account View).

FIG. 10D is an example of the presentation of "Accounts" CRM data during an offline session (New Account View).

FIG. 11A is an example of the presentation of "Contacts" CRM data during an offline session (Home View).

FIG. 11B is an example of the presentation of "Contacts" CRM data during an offline session (All Contacts View).

FIG. 11C is an example of the presentation of "Contacts" CRM data during an offline session (Specific Contact View).

FIG. 11D is an example of the presentation of "Contacts" CRM data during an offline session (New Contact View).

FIG. 12A is an example of the presentation of "Opportunities" CRM data during an offline session (Home View).

FIG. 12B is an example of the presentation of "Opportunities" CRM data during an offline session (All Opportunities View).

FIG. 12C is an example of the presentation of "Opportunities" CRM data during an offline session (Specific Opportunity View).

FIG. 12D is an example of the presentation of "Opportunities" CRM data during an offline session (New Opportunity View).

DETAILED DESCRIPTION OF THE INVENTION

The following detailed description will first describe the structure of an online session that may be simulated by an offline session in accordance with the invention. The structure of the offline session, itself, is then detailed. Following the description of the offline session, preparation of the client prior to conducting such offline sessions (e.g., installation and synchronization phases) is described.

Online Session

Referring to the drawings, FIG. 1 illustrates an online session between a client 100 and a remote server 200. The client includes a local interface 110 while the remote server 200 includes a database 210 and functional logic 220 that is invoked to manipulate the data residing in the database 210. The client 100 establishes communication channels through a network 150 that connects the client 100 to the remote server 200.

In one environment, the network 150 used by the online session may be the Internet. In such an environment, the client 100 may be a laptop or desktop computer and the local interface 110 may be a web browser such as Internet Explorer or Netscape Navigator. The functional logic 220 at the remote server 200 may be invoked through an underlying application or specification such as a CGI program (including, for example, scripts such as Perl), Java servlet (including, for example, JavaServer Pages, or JSP, technology), daemon, service, system agent, server API solution (including, for example, ISAPI or NSAPI) or any other technique or technology known in the art. The database 210 may be a relational database management system such as Oracle or DB2. The communication channels between the local interface 110 and the remote server 200 may be governed by the HTTP protocol. For example, by selecting various options from a web page, a user transmits instructions in the form of an HTTP message through the Internet to the remote server. Upon receiving the HTTP message, the underlying program, component, or application at the remote server performs the pertinent functional logic to interact with and manipulate the data in the database in accordance with the instructions. Those skilled in the art will recognize that the foregoing

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general online client-server scheme is merely illustrative and that various alternatives, possibly exploiting different technologies, standards and specifications, may also be utilized to create an online session over the Internet in accordance with FIG. 1. Those skilled in the art will also appreciate that functional logic, program, service, agent, API or other computer code and/or data referred to herein or otherwise utilized may be stored, loaded and/or executed from or otherwise embodied in a suitable computer-readable medium, in accordance with the requirements of a particular implementation.

In the field of customer relationship management ("CRM"), such an online client-server scheme can provide the capability to track contacts, leads and customer inquiries without needing a complex software solution on the client-side. For example, in one instance of an online CRM session, the user securely logs into the remote server by entering a username and a password through his local web browser, as shown in FIG. 2. Once the user successfully logs into the remote server, he may be presented with an initial home page that provides access to further features and information. As shown in FIG. 3, for example, the initial home page may provide the user with a brief synopsis of his upcoming events 310 and tasks 320. Furthermore, the initial home page provides access 330 to further pages that enable the user the track, manage and organize other data including campaigns, leads, accounts, contacts, opportunities, forecasts, cases, and reports. Those skilled in the art will recognize that FIGS. 2 and 3 are merely examples of one way of presenting CRM information on a local interface and that there exist innumerable ways (e.g., look and feel) to present CRM information on a local interface in accordance with the online client-server scheme presented herein. Furthermore, those skilled in the art will recognize that the online CRM session described herein is merely an example of one area in which the online client-server scheme may be exploited and that there exist innumerable fields and areas in which this online client-server scheme may be exploited.

Offline Session

As shown in FIG. 4, during an offline session, in contrast to an online session as described earlier and illustrated in FIG. 1, the client 100 can no longer establish a communications channel through the network 150 to connect to the remote server 200. As such, at least portions of the data from the database 210 and portions of the functional logic 220 at the remote server 200 are imported to the client 100 so that the client 100 can conduct an offline session in isolation. In FIG. 4, at least a subset 130 of the data 210 is imported to the client 100. Similarly, at least a subset 120 of the functional logic 220 is also imported to the client. This imported functional logic 120 is embedded into a format capable of being interpreted and performed by the local interface.

In an embodiment of an offline session in which the local interface 110 is a web browser, both the data 130 and functional logic 120 may be stored according to an open standards formatting protocol. For example and without limitation, the data 130 may be stored in a single or a series of documents in XML (Extensible Markup Language), possibly including, for example, XSL stylesheets (which are XML documents, themselves) for rendering the data into HTML documents. As is known to those skilled in the art, XML may be considered a markup language (or a specification for creating markup languages) that is used to identify structures within a document. Similarly, the functional logic 120 may be embedded in a document utilizing a markup language and may be expressed as a scripting language within the document. For example and without limitation, the functional logic 120 could be expressed as JavaScript or VBScript that is embed-

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ded in an HTML (HyperText Markup Language) document. As used herein, the term “embedded” may mean either actually embedding the JavaScript (or any other functional logic in a format capable of being interpreted and performed by the web browser) code in the HTML document, or alternatively, accessing a separate JavaScript document by, for example, providing the URL (relative or full address) of the JavaScript source code file in the HTML document. As such, when the HTML document is rendered by the web browser, depending upon certain actions taken by the user, certain portions of the functional logic **120** (e.g., JavaScript) may be interpreted and performed by the web browser. Such functional logic **120** may interact with the data **130** expressed as XML. For example and without limitation, a user may request to view portions of the data **130** on the web browser. In response to the request, by calling an XSLT (Extensible Stylesheet Language for Transformations) processor that is incorporated into the web browser (e.g., MSXML Parser) or any other comparable XSLT technology residing at the client, the functional logic **120** may access the appropriate portions of the data **130** (e.g., in XML documents) in conjunction with the appropriate XSL stylesheets, in order to transform or render such data **130** into an HTML document that is visually presented on the web browser.

Preparation of Client for Offline Session

Prior to conducting an offline session as described in the foregoing, an initial installation phase and subsequent synchronization sessions may be needed to prepare the client **100** for such an offline session. During the installation phase, an installation or setup executable may be downloaded from the remote server **200** to the client **100**. As depicted in FIG. 5, during the installation phase **500**, the executable prepares the client for conducting an offline session by, for example and without limitation, (1) establishing a directory structure in the client’s file system (Step **510**), (2) downloading navigational markup documents with embedded functional logic (e.g., HTML files with embedded JavaScript code or HTML files and related separate JavaScript files) (Step **520**); (3) downloading other miscellaneous installation components possibly including static HTML files, stylesheets, XSL templates, ActiveX controls, system shortcuts, local language components and, if not already available, an XML parser that may be integrated into the web browser (e.g., MSXML Parser) (Step **530**).

Furthermore, prior to going offline, a user may synchronize the imported subset of data **130** at the client with the data residing in the database **210**. For example, if synchronization is occurring for the first time, all data residing in the database **210** that is needed for conducting an offline session may be downloaded from the database **210** to the client **100** (Step **550**). This downloaded data may, for example, be defined and customized according to the user’s criteria for conducting an offline session. In one implementation, the synchronization process may download this data as XML documents (e.g., according to data type such as accounts, contacts, opportunities, etc.). Once such XML documents are downloaded, XSL templates that are used to visually render the data (e.g., **130** in FIG. 4) on the web browser may be constructed at the client by utilizing the formatting instructions provided by the XML documents. Alternatively, such XSL templates might also be generated at the server and subsequently downloaded to the client. During subsequent synchronization processes prior to going offline **540**, as depicted in FIG. 5, modified data records and data records created since the previous synchronization may be downloaded to the client (Step **560**). Furthermore, the synchronization process **540** may also provide the opportunity to download (or modify) user customizations (e.g., XML

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layout information used to construct XSL templates at the client or the XSL templates themselves) for the visual representation of data and other information on the web browser (Step **570**). Similarly, upon reestablishing a connection with the remote server **200**, the user may also desire to conduct a synchronization process **580** in order to upload any modified or newly created data records to the remote database **210** (Step **590**). In one implementation of the synchronization process, the communication channel between the client **100** and the remote server **200** may be established through the HTTP protocol using XML-RPC and a related HTTP/HTTPS server based XML API. Those skilled in the art will recognize that there are alternative synchronization processes other than the one presented in FIG. 5 that may be conducted in accordance with the present invention. For example and without limitation, all synchronization processes, regardless of whether the subsequent activity is an offline session or the re-establishment of an online connection, may simultaneously download modified and newly created data records from the server database to the client as well as upload modified and newly create data records from the client to the server database. Additionally, those skilled in the art will recognize that any variety of techniques and models known in the art may be used implement the synchronization process in order to maintain consistency and coherency while accessing data (e.g., atomic, sequential or causal consistency, etc.).

FIG. 6 illustrates one embodiment of a process for initiating and conducting an offline CRM session. As depicted, in this embodiment, an initial installation process should be conducted before an offline session can begin (e.g., Steps **610**, **510**, **520**, **530**). After installation, a user may initiate an offline session by opening an HTML page downloaded to the client during the installation phase (Step **620**). While still online, the user may then synchronize local client data with the remote database before going offline (Step **630** and expanded in Steps **632**, **634**, **550**, **560**, **590**). As shown in FIG. 6, this may involve downloading data from the remote server (Step **550**) as well as uploading data to the remote server (Step **590**), and if necessary, an initial download of all offline session data (Step **550**). As previously discussed, one implementation of such downloading and uploading may be implemented through HTTP communications channels using XML-RPC. Once synchronization is complete, the user may go offline and manipulate, view, and modify his customer relationship data by selecting from various options through the web browser (Step **640**). For example and without limitation, the user may view his calendar, tasks, and activities (Step **642**). Additionally, data may be organized into certain categories such as accounts, contacts, and opportunities. The user may be able to maneuver through the web browser to access, edit, create, delete, or otherwise modify data within these categories (Steps **642**, **644**, **646**, **648**).

FIGS. 7 to 12D represent examples of the local interface **110** as a web browser that may serve as visual examples for certain steps in the flowchart of FIG. 6. For example, FIG. 7 illustrates a login interface to access the remote server to initiate a synchronization corresponding to **632** of FIG. 6. Similarly, FIG. 8 illustrates the synchronization process of downloading modified and newly created records from the remote database as in **560** of FIG. 6 (and possible uploading of any modified or newly created records to the remote database as in **590** of FIG. 6). Corresponding to Step **642** in FIG. 6, FIG. 9A illustrates one example of an offline home page and FIGS. 9B to 9E illustrate various other alternative “Home” views that may be accessed by the user during an offline session. Similarly, corresponding to Step **644** in FIG. 6, FIGS. 10A to 10C illustrate various views of data organized

into an Accounts category. Corresponding to Steps 646 and 648 in FIG. 6, FIGS. 11A to 11D illustrate various views of data organized into a Contacts category and FIGS. 12A to 12D illustrate various views of data organized into an Opportunities category, respectively.

The various embodiments described in the above specification should be considered as merely illustrative of the present invention. They are not intended to be exhaustive or to limit the invention to the forms disclosed. Those skilled in the art will readily appreciate that still other variations and modifications may be practiced without departing from the general spirit of the invention set forth herein. For example and without limitation, those skilled in the art will recognize that there exist alternative proprietary technologies, languages and open standards (e.g., other than JavaScript, XML, XSLT, XML-RPC, HTML, HTTP, etc.) that may be practiced in the context of the Internet and World Wide Web in accordance with the invention set forth herein. Furthermore, while much of the foregoing discussion has been described in the context of the World Wide Web and the Internet (e.g., local interface 110 is a web browser), those skilled in art will recognize that the invention disclosed herein may be implemented in other network environments as well. Similarly, while much of the foregoing discussion utilized the CRM area as an example, those skilled in the art will also recognize that other fields and areas may exploit the invention disclosed herein. Therefore, it is intended that the present invention be defined by the claims that follow.

I claim:

1. A method of conducting and then simulating an online database session, including:

conducting from at least one client machine through a local interface an online database session via a database server API while the client machine is connected by a network to the online database, including invoking database manipulation logic running on a remote database server responsive to instructions transmitted through the local interface;

prior to going offline, importing to the client machine at least a data subset and a logic subset,

wherein the data subset is a subset of data from the online database to be used in an offline database session following the online database session;

wherein the logic subset is a subset of the database manipulation logic running on the remote database server to be locally simulated on the client machine following the online database session; and

wherein the logic subset and the data subset are embedded within at least one document and the logic subset is embedded in the document in a format usable by the local interface; and

conducting a simulated database session using the local interface to access a local version of the database server API in an offline mode, following the online database session, using an imported data subset and a logic subset to simulate and reproduce a user interface to and functionality of the online database session without being connected to the online database.

2. The method of claim 1, further comprising: importing user customizations for presentation of the imported data by the local interface while the client is online.

3. The method of claim 1, wherein the user interface includes a web browser.

4. The method of claim 3 wherein the embedded logic subset is expressed in a scripting language understood by the web browser.

5. The method of claim 1, wherein the format comprises at least one document that utilizes a markup language to identify structures within the document.

6. The method of claim 1, wherein the imported data subset is stored in at least one document that utilizes a markup language to identify structures within the document.

7. The method of claim 1, wherein the imported data subset and embedded logic subset relate to customer relationship management.

8. The method of claim 1, wherein the logic subset is embedded into an HTML document.

9. The method of claim 1, wherein the logic subset is accessed using a URL embedded into an HTML document.

10. The method of claim 1, wherein simulating, only so long as the client is offline, an online session with the database by invoking the logic subset, includes: invoking the embedded logic subset to build at least one dynamically generated screen to enable a user to manipulate the data imported.

11. The method of claim 1, wherein the logic subset embedded into a document in a format capable of being used by the local interface includes: database server logic for creating one or more new records to hold data when the client is offline.

12. The method of claim 1, wherein the data subset is corresponds to a user criteria for conducting an offline session.

13. The method of claim 1, wherein the database comprises a relational database.

14. A system that enables a client system to conduct and to simulate an online database session, including:

an online database server, sometimes simulated, that includes online database manipulation logic running on the database server accessed via a database server API that manipulates an online database responsive to instructions received from a local interface of a client machine;

a data packaging service, coupled to the database server, that packages a data subset of data stored by the online database to be used in an offline database session;

a logic packaging service, coupled to the database server, that packages a logic subset of the database manipulation logic running on the database server to be locally simulated on the client machine following the online database session; and

an export service, operable during an online session, that exports for use by the client machine at least a data subset a the logic subset, wherein the export service embeds the logic subset and the data subset within at least one document in a format usable by the local interface of the client machine; and

wherein the document containing the data subset and the logic subset includes instructions usable by the local interface on the client machine via a local version of the database server API to conduct a simulated database session in an offline mode and reproduce a user interface to and functionality of the online database session without being connected to the online database.

15. The system of claim 14, an import service that imports data from the client that had been manipulated during the simulated database session conducted by the client while the client was not connected to the online database.

16. The system of claim 14, wherein the export service is further capable of exporting user customizations for the presentation of the exported data by the user interface.

17. The system of claim 14, wherein the export service is implemented with XML-RPC.

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18. The system of claim 14, wherein the user interface includes a web browser.

19. The system of claim 18 wherein the embedded logic subset is expressed as a scripting language understood by the web browser.

20. The system of claim 14, wherein the documents utilize a markup language to identify structures within the documents.

21. The system of claim 14, wherein the exported data subset is exported as at least one document that utilizes a markup language to identify structures within the document.

22. The system of claim 14, wherein the exported data subset and embedded logic subset relate to customer relationship management.

23. A non-transitory computer readable media including computer instructions that, when run on a client machine, implements on at least one client machine:

conducting from at least one client machine through a local interface an online database session via a database server API while the client machine is connected by a network to the online database, including invoking database manipulation logic running on a remote database server responsive to instructions transmitted through the local interface;
prior to going offline, importing to the client machine at least a data subset and a logic subset,
wherein a data subset of data from the online database to be used in an offline database session following the online database session;

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wherein the logic subset of the database manipulation logic running on the database server to be locally simulated on the client machine following the online database session; and

wherein the logic subset and the data subset are embedded within at least one document and the logic subset is embedded in the document in a format usable by the local interface; and

conducting a simulated database session using the local interface to access a local version of the database server API in an offline mode, following the online database session, using the imported data subset and logic subset to simulate and reproduce a user interface to and functionality of the online database session without being connected to the online database.

24. The computer instructions of claim 23 wherein the user interface includes a web browser.

25. The computer instructions of claim 23, wherein at least a portion of the computer instructions are expressed in a scripting language.

26. The computer instructions of claim 23, wherein the format comprises at least one document that utilizes a markup language to identify structures within the document.

27. The computer instructions of claim 23, wherein the imported data subset is stored in at least one document that utilizes a markup language to identify structures within the document.

28. The computer instructions of claim 23, wherein the computer instructions and the imported data subset relate to customer relationship management.

* * * * *